AMENDMENTS TO THE DRAWINGS

In Fig. 3(a), the label of the axis of ordinates is amended read "Rate of Recovery (%)."

Attachment: 1 Replacement Sheet

REMARKS

Status of the Application

With this Amendment, Applicant amends claim 1, cancels claim 2 and adds new claims 17-19. Applicant submits that the new and amended claims are fully supported by the disclosure. No matter has been added.

After entry of this Amendment, claims 1, 3-19 will be pending in this Application.*

Formal Matters

Applicant thanks the Examiner for the indication that the drawings filed on March 17, 2005 are accepted.

Drawings

Applicant notes that in Fig. 3(a) the axis of ordinates of the graph is labeled "Recover Voltage (V)." As indicated at page 15, lines 12-13 of the specification, the axis of ordinates of Fig. 3(a) should be labeled "Rate of Recovery (%)." Applicant has provided an replacement drawing amending Fig. 3(a) accordingly.

Claim Rejections

Claims 1-16 — 35 U.S.C. 102(b)/ 103(a)

Claims 1-16 are rejected under 35 U.S.C. 102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as allegedly being obvious over U.S. Patent No.

* Applicant notes that in the Preliminary Amendment of March 17, 2005 and the 37 C.F.R. § 1.111 Amendment of January 5, 2009, claims 14 and 16 were improperly labeled "Previously presented." These claims are actually "Original."

6,366,056 to Podrazhansky *et al.* ("Podrazhansky"). Claim 2 has been canceled without prejudice or disclaimer thereby rendering its rejection moot. Applicant traverses this rejection.

Addressing claim 7, Podrazhansky does not disclose or suggest at least "a control unit which carries out an intermittent power feeding in which a power feeding and a pause are repeatedly executed, when a lithium ion secondary battery is discharged with not less than a predetermined discharge rate, and wherein said control unit executes said pause for a period not less than the period required for the voltage of the lithium ion secondary battery to restore up to not less than 70% of an open circuit voltage," as recited in the claim.

Podrazhansky is directed to a method of fast charging lithium-based batteries. The charging regimen disclosed by Podrazhansky includes several charging stages to effect battery charging (column 3, lines 7-11). While Podrazhansky's charging method provides repeated charging pulses alternated with rest periods, the reference is directed ***only to charging*** lithium-based batteries.

Podrazhansky discloses that charge pulses 1A-1N preferably have durations of 0.01 to 100 ms (column 6, 62-63, Fig. 1). Rest periods 2A-2M preferably have a duration not greater than the duration of the charge pulses 1A-1N (column 7, lines 32-33, Fig. 1). In the preferred embodiment of Podrazhansky, the rest periods 2 have a duration of 2 to 6 milliseconds, depending upon the type of anode in the ability of that anode to absorb the lithium (column 7, lines 44-46, Fig. 1). To the extent that Podrazhansky discloses discharging the battery, it is only as a portion of the charging process (column 8, lines 46-58).

Podrazhansky also discloses a dendrite removal stage in which discharge pulses (4, 10, 17) are fixed in amplitude and duration, and have amplitude of 0.1 to 5 amps, and durations of 1 to 50 ms. See column 8, lines 33-34, and Fig. 1. These discharge pulses are performed in the dendrite removal stage which is one of the steps included in ***charging*** the lithium-based batteries. Thus, this step is not performed "when the lithium-ion secondary battery is discharged" as recited in claim. The discharge pulses of Podrazhansky are only performed such that opposite charge is applied in order to remove dendrites when charging the lithium-based batteries.

Further, Podrazhansky only discloses that the rest periods (3, 5, or 6) following the charge pulse IN preferably as a duration not greater than the duration of the charge pulse IN. See column 7, lines 41-43. Podrazhansky, however, is silent regarding "said pause is executed for a period not less than that period required for the voltage of the lithium ion secondary battery to restore up to not less than 70% of the open circuit voltage after the lithium-ion secondary battery is discharged until the voltage thereof reaches the discharge end voltage, when the lithium-ion secondary battery is discharged," as in embodiments of the present invention.

Additionally, limited discharging of the battery during the charging process is provided as a method of removing unwanted lithium plating on the electrodes which occurs during charging. As disclosed by Podrazhansky, a plating removal stage comprises a plurality of alternating charge pulses and discharge pulses separated by rest period. See column 8, lines 46-58.

Thus, Podrazhansky only discloses a process for ***charging*** lithium-based batteries. In Podrazhansky, a charging stage, a dendrite and particle removal stage, a lithium plating removal stage, and a measurement stage are included in the steps of ***charging*** lithium-based batteries.

On the other hand, Applicant's claimed system and method recite both charging and discharging (i.e., supplying power to a load) operations, wherein the pause during discharge is for a period that allows the battery to restore up to not less than 70% of an open circuit voltage. Podrazhansky does not provide this disclosure.

The Examiner alleges that the claimed pause allowing the battery to restore up to not less than 70% of an open circuit voltage is *inherently disclosed* by Podrazhansky at column 7, lines 32-46. However, as cited by the Examiner, Podrazhansky only discloses that the rest periods have a duration not greater than the duration of the charge pulses and may vary from charge stage to charge stage. Applicant respectfully submits that "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981). Thus, the Examiner has not established that the claimed features are inherent in the disclosure of Podrazhansky.

Thus, as recited in claim 1, Podrazhansky does not disclose or suggest at least "wherein said pause is executed for a period not less than the period required for the voltage of the lithium ion secondary battery to restore up to not less than 70% of an open circuit voltage after the lithium ion secondary battery is discharged until the voltage thereof reaches a discharge end voltage, when the lithium ion secondary battery is discharged."

Also, with regard to claims 3 and 9, Podrazhansky does not disclose or suggest at least "wherein said control unit executes said pause for a period not less than the period required for the voltage of the lithium ion secondary battery go down by not less than 70% of a voltage difference between the open circuit voltage and the charge end voltage after the lithium secondary battery is charged until the voltage thereof reaches the charge end voltage, when the lithium ion secondary battery is charged," as recited in the claim. Applicant respectfully submits that these features are also not inherent in the disclosure of Podrazhansky.

The Examiner alternatively alleges that one of ordinary skill in the art could arrive at an optimized value of open circuit voltage through routine experimentation on the rest periods. Applicant respectfully submits that "A particular parameter must be first recognized as a result-effective variable, *i.e.*, a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." (MPEP 2144.05 (II)(B), citing *In re Antonie*, 559 F.2d 618 (CCPA 1977)). In *In re Antonie*, the court held that the parameter that would have to be optimized to achieve the claimed limitation was not recognized in the art to be a result-effective variable.

In this case, none of the cited references recognizes that optimizing the durations of power feeding and rest periods is a function of allowing a battery to restore up a percentage of its open circuit voltage. Thus, the percentage of open circuit voltage as recited in claim 7 is not recognized in the art to be a result-effective variable. Therefore, it would not have been obvious to one of skill in the art to optimize this parameter, and it would not have been obvious to one of skill in the art to try different possibilities for this parameter.

In view of the above, independent claims 1 and 7 are not anticipated or rendered obvious by Podrazhansky and are therefore patentable. Claims 3-6 and 8-16 are patentable at least by virtue of their dependencies from one of claims 1 and 7. Further, claims 3 and 9 contain similar features as noted above and are therefore patentable for at least these additional reasons.

New Claims

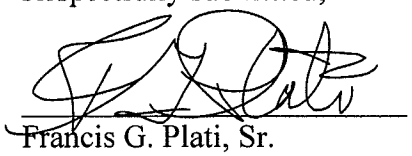
Applicant has added new claims 17-19. New independent claim 17 recites features similar to the features recited in claims 1 and 7 and is therefore patentable for similar reasons. New claims 18 and 19 depend from claim 17 and are patentable at least by virtue of their dependence.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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